

DFS Applications Full Tree Traversal Cycle Finding Component Finding Articulation Point Finding

Week-10, Lecture-01

Course Code: CSE221

Course Title: Algorithms

Program: B.Sc. in CSE

Course Teacher: Tanzina Afroz Rimi

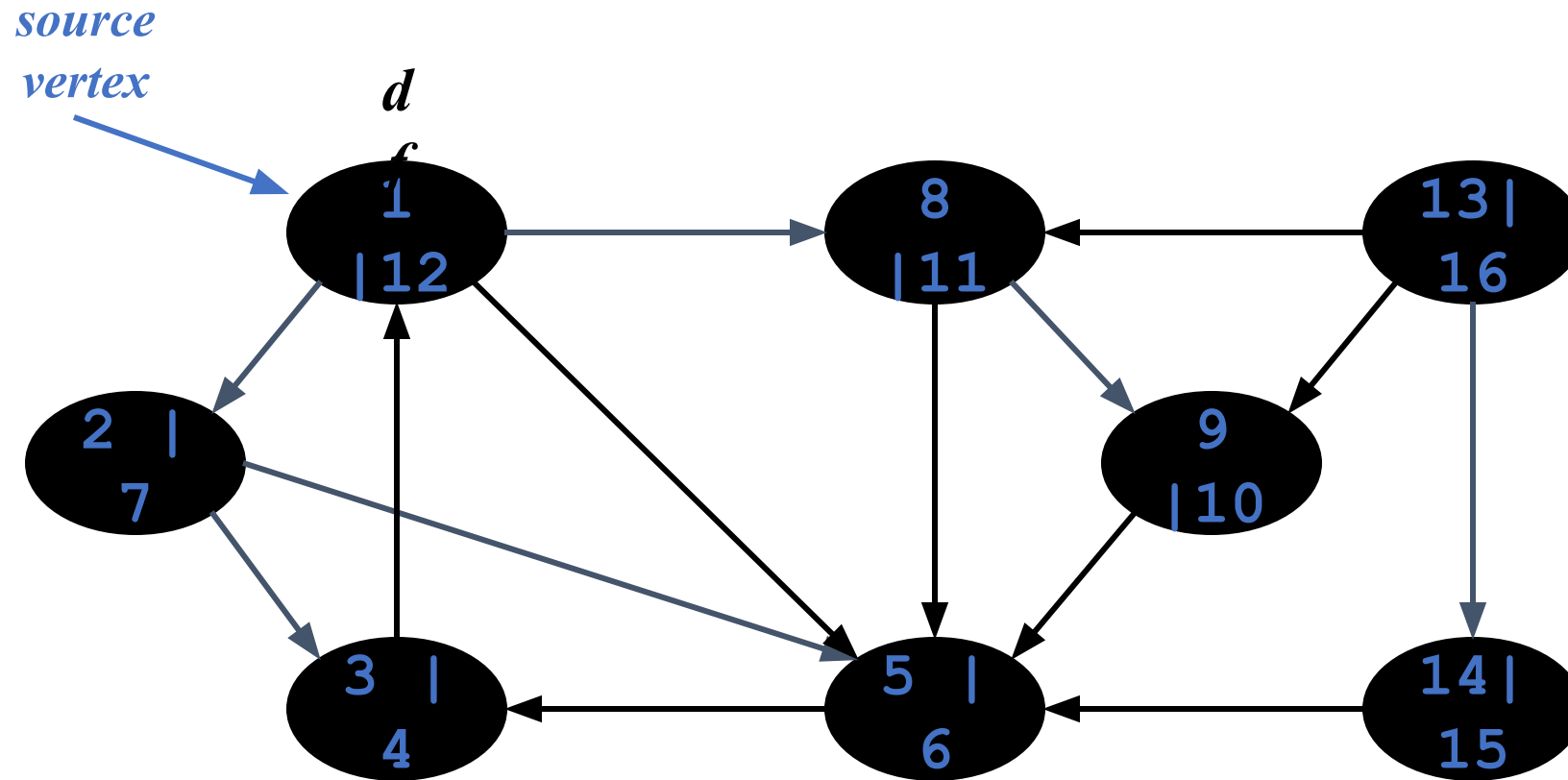
Designation: Lecturer

Email: tanzinaafroz.cse@diu.edu.bd

DFS: Kinds of edges

- DFS introduces an important distinction among edges in the original graph:
 - *Tree edge*: encounter new (white) vertex
 - The tree edges form a spanning forest
 - *Can tree edges form cycles? Why or why not?*
 - *No*

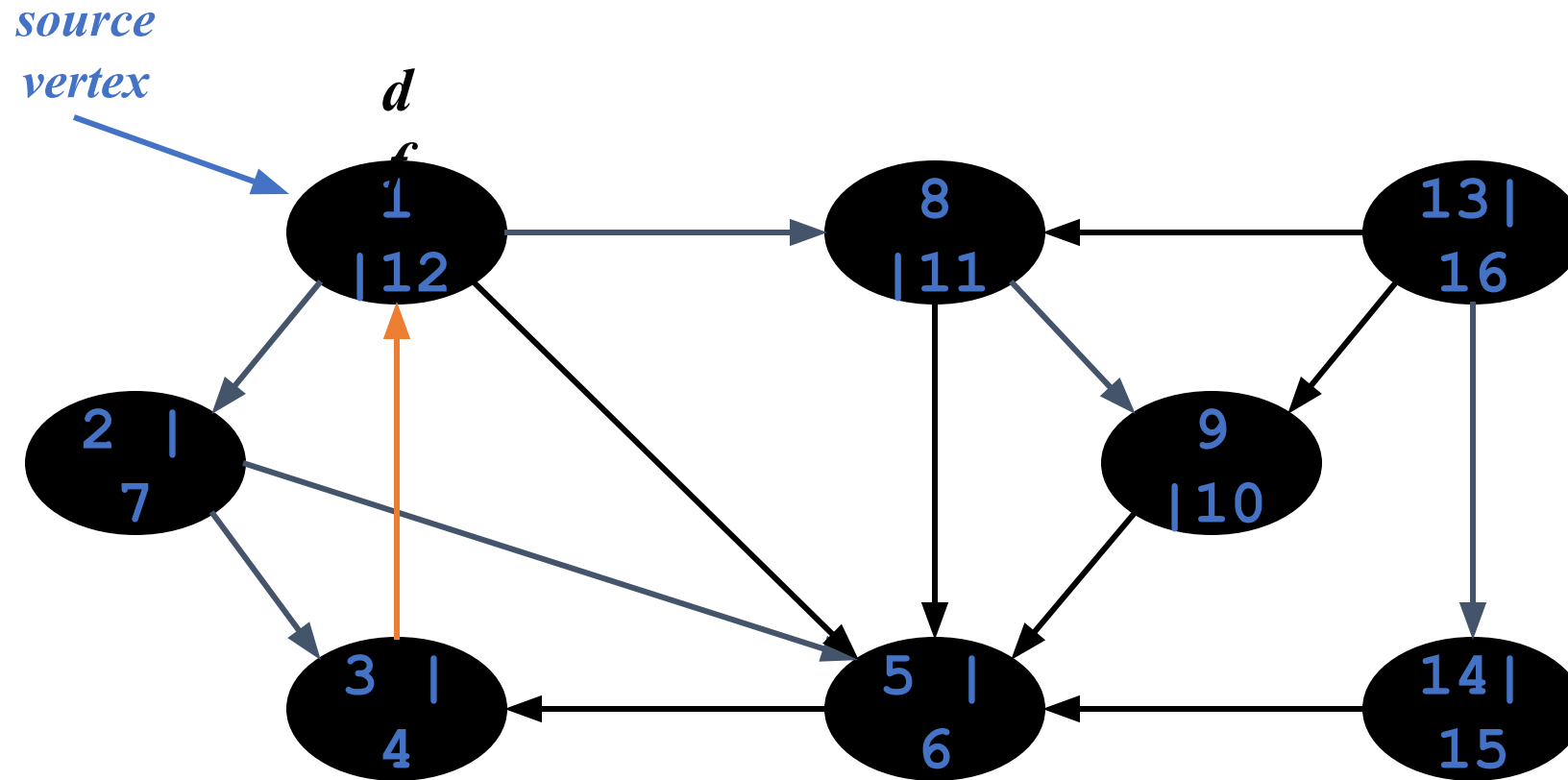
DFS Example



DFS: Kinds of edges

- DFS introduces an important distinction among edges in the original graph:
 - *Tree edge*: encounter new (white) vertex
 - *Back edge*: from descendent to ancestor
 - Encounter a grey vertex (grey to grey)
 - Self loops are considered as to be back edge.

DFS Example



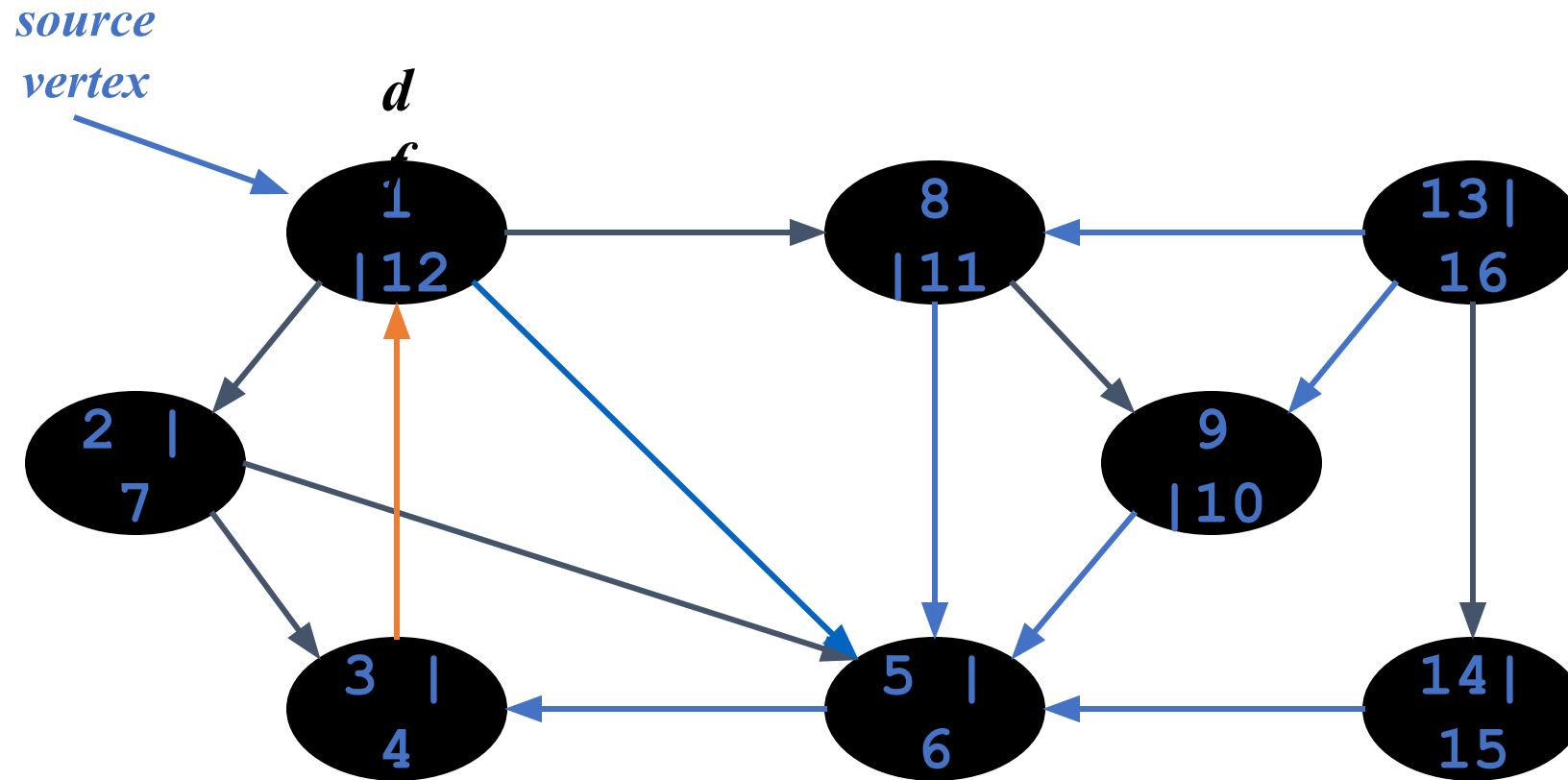
DFS: Kinds of edges

- DFS introduces an important distinction among edges in the original graph:
 - *Tree edge*: encounter new (white) vertex
 - *Back edge*: from descendent to ancestor
 - *Forward edge*: from ancestor to descendent
 - Not a tree edge, though
 - From grey node to black node

DFS: Kinds of edges

- DFS introduces an important distinction among edges in the original graph:
 - *Tree edge*: encounter new (white) vertex
 - *Back edge*: from descendent to ancestor
 - *Forward edge*: from ancestor to descendent
 - *Cross edge*: between a tree or subtrees
 - From a grey node to a black node

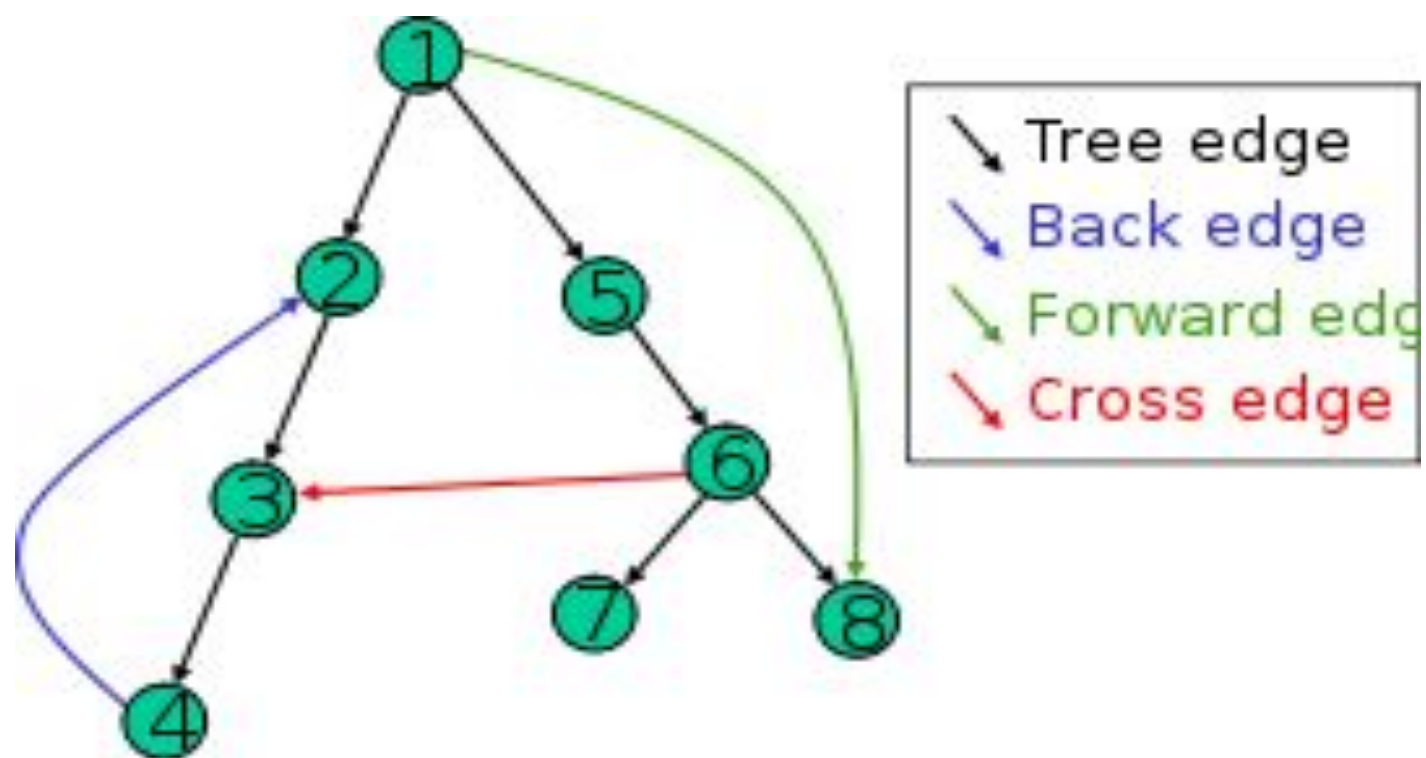
DFS Example



Tree edges *Back edges* *Forward edges* *Cross edges*

DFS: Kinds of edges

- DFS introduces an important distinction among edges in the original graph:
 - *Tree edge*: encounter new (white) vertex
 - *Back edge*: from descendent to ancestor
 - *Forward edge*: from ancestor to descendent
 - *Cross edge*: between a tree or subtrees
- Note: tree & back edges are important; most algorithms don't distinguish forward & cross



Textbooks & Web References

- Text Book (Chapter 22)
- www.geeksforgeeks.org

Practice

